

Abstract

The objective is to incarcerate a Lewis acid metal in a polymer and to make this catalyst recoverable while maintaining its function as a Lewis acid metal catalyst. The present invention is a polymer-incarcerated Lewis acid metal catalyst in which a Lewis acid metal is incarcerated in a crosslinked polymer and the crosslinked polymer is crosslinked using the crosslinking groups contained in a crosslinkable polymer. The polymer incarcerated Lewis acid metal catalyst is characterized by the crosslinkable polymer containing at least one type of monomer unit containing hydrophobic substituents and hydrophilic substituents containing crosslinking groups, and the hydrophobic substituents contain aromatic substituents. This crosslinkable polymer preferably comprises at least one type of monomer unit containing hydrophobic substituents and hydrophilic substituents containing crosslinking groups and a monomer unit containing hydrophobic substituents. This catalyst can be obtained by subjecting a polymer micelle incarcerated Lewis acid metal obtained by mixing an organic solution containing a crosslinkable polymer and a Lewis acid metal with a bad solvent to a crosslinking reaction. This catalyst is useful as a catalyst in aldol reactions, cyanolation reactions, allylation reactions, Michael reactions, Mannich reactions, Diels Alder reactions and Friedel Crafts reactions.